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Superior Court Says
Permits Needed To Sell Percents
In Form Of Deeds

By Don L. Gilman, Attorney

In 1935, Mr. A. purchased a lot in a proven oil field. He then made an agreement with an oil company to drill an oil well on this lot. After the company had drilled the well close to the oil sand, Mr. A. decided to dispose of some of his land owner's royalty interests, he having retained for himself a one-third interest, as the landowner, in all of the oil, gas and other hydrocarbon substances to be produced from the lot. So he divided the one-third interest in the oil into percents and made out grant deeds for each 1%, making a total of 33 grant deeds, each calling for a 1% interest and one grant deed calling for one-third of 1%. These grant deeds were then taken to a broker's office, the situation explained to the broker and a certain amount was agreed upon for the sale and disposition of the grant deeds. The broker then proceeded to sell the grant deeds to anyone who would buy them. John Smith bought five of these grant deeds from the broker and paid the broker $1000 for each deed, making a total of $5000. The deeds were signed by Mr. A. and were delivered by the broker to John Smith. The broker turned over all of the money he had received to Mr. A, deducting a small amout for handling the transaction.

The oil well came in but proved to be a very small producer and soon did not produce enough to pay for pumping it. So John Smith wanted his $5000 back. He consulted with an attorney and the attorney filed an action in Court upon the theory that Mr. A. had obtained no permit from the Corporation Commissioner's office to sell and dispose of the grant deeds and that a permit to sell and dispose of such grant deeds was necessary and the entire transaction regarding the sale of the grant deeds from Mr. A. to John Smith was void. The case finally came on for trial and the Court decided that a permit from the Corporation Commissioner's office was necessary, that the sale of the grant deeds from Mr. A. to John Smith was void because Mr. A. had obtained no permit from the Corporation Commissioner's office and that John Smith was entitled to recover his money, the transaction being void under the law. All of which means that the sale of landholders' or leaseholders' royalty interest in oil land, without obtaining a permit from the Corporation Commissioner's office for the sale of such grant deeds, is unlawful and that the practice of selling such grant deeds by brokers or other persons will have to be stopped, unless a permit is obtained from the Commissioner of Corporations. It has heretofore been the idea that a landowner and even a lease holder might assign or transfer a portion of his royalty interest in an oil well by giving deed to the purchaser, the theory being that by the use of a grant deed an interest in the land itself was conveyed. In other words, if a man had a lot 60 by 160 in a producing oil field, he could, by a grant deed, sell a one-hundredth interest in the title to that property and transfer that one-hundredth interest. This conception of the law is, obviously, incorrect, because by the giving of a grant deed to a one-hundredth interest in a portion of a lot, it would be difficult to ascertain just what portion or how many inches or feet in the particular lot the purchaser would be entitled to receive. The point is that the issuance and sale of this particular type of grant deed is, in effect, a sale of a "security" under the Corporate Securities Act, which Act distinctly states that one who sells a certificate of interest in an oil, or gas or mining lease or title must obtain a permit from the Corporation Commissioner's Office. The Courts in arriving at a decision in a situation as is presented above, go behind the mere form or name of the paper in consummating the sale, and look to the substance. It makes no difference whether the paper given to a purchaser is called a "grant deed," a 'deed," a "unit," a "certificate of interest," an "assignment," "lease" or just a "memorandum" if, by that particular paper, there is a transfer of an interest in an oil or gas lease or title.

From the viewpoint of a prospective investor in an oil or gas proposition, the requirement that a permit must be first obtained from the Corporation Commissioner's Office before this security can be sold is an important one for the protection of such an investor. This is especially true, if it is considered that if such were not the law, it would be easy to make a wholesale business of selling grant deeds calling for percents in oil properties. A rather interesting situation arises in connection with these sales: Sometime ago, some parties purchased some units in an oil well at a very reasonable price, when the well first started. No permit had ever been issued by the Corporation Commissioner's Office for the sale of these units which, therefore, were void. Afterwards the well came in as a very big producer. The owners of the well then conceived of the idea of getting rid of the persons who had purchased the original interests in the well so cheaply, so they filed an action against the interest holders to have these interests declared void, their theory being that no permit had been granted by the Corporation Commissioner's Office. The Supreme Court, in passing upon this question, stated that the owners of the oil well could not take advantage of their own wrong, as they had been the instigators, as well as the participators, in making the sale in violation of law, and that the contracts and interests that the parties had bought would remain as purchased.

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Electrical Mapping Of Oil Structures

By J. J. Jakosky and C. H. Wilson.

Respectively, technical director and mining engineer of International Geophysics, Los Angeles; members, A.I.M.E.

PART ONE

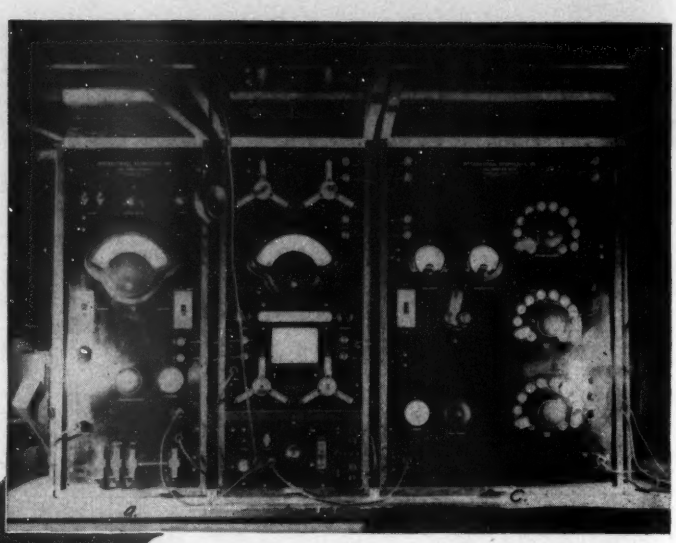

Fig. 1. Apparatus for conducting electrical geophysical surface measurements.

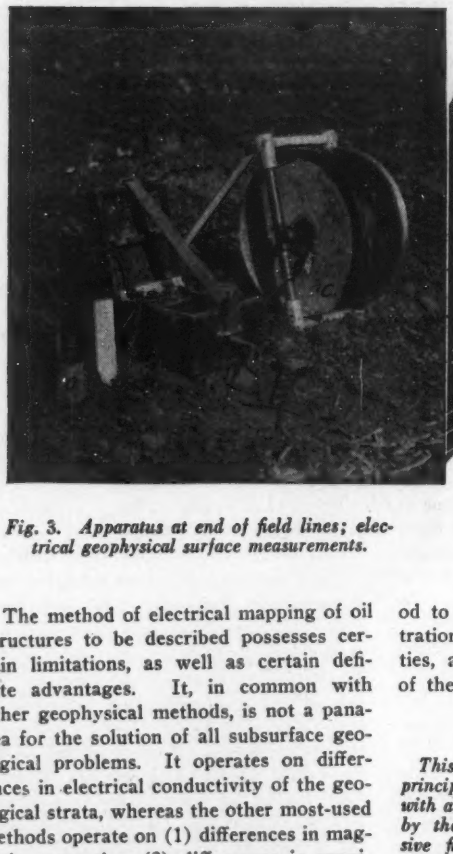

Fig. 3. Apparatus at end of field lines; electrical geophysical surface measurements.

Fig. 2. Instrument truck, showing high-voltage bushings for connecting external line wires.

The method of electrical mapping of oil structures to be described possesses certain limitations, as well as certain definite advantages. It, in common with other geophysical methods, is not a panacea for the solution of all subsurface geological problems. It operates on differences in electrical conductivity of the geological strata, whereas the other most-used methods operate on (1) differences in magnetic properties, (2) differences in gravimetric properties, or (3) differences in seismic properties. This modification of the resistivity method is therefore able to obtain subsurface information under conditions not favorable to the other methods mentioned. Where the other methods have been employed with ambiguous results it may act as a complementary method.

The depth or subsurface penetration is governed by the separation between two electrodes placed at the surface of the ground. From a theoretical viewpoint the ultimate depth range is much greater than is eeconomically feasible in the method to be described. The depth of penetration depends upon relative conductivities, and varies from 25 to 35 per cent of the distance between the surface electrodes, and at the greater depths, the cost of running out the lines becomes considerable. Generally speaking, at depths of 2000 ft. or less the cost is about half that of seismic work; to depths of 3000 ft. the cost is about 65 per cent that of seismic work; at greater depths the cost approaches, and may even exceed, seismic work. Commercially then, the method is chiefly applicable to mapping of subsurface structures within 3500 to 4000 ft. of the surface. In areas where shallow beds are in general conformity with the deeper oil-producing horizons, the method is of particular advantage. In areas where the shallow beds are structurally indicative of the deeper beds, then the methods may often be of special advantage for general reconnaissance, with more detailed deeper work by the gravitational or seismic methods.

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This paper describes briefly the operating principles and the general results obtained with an electrical resistivity method developed by the senior writer which has had extensive field application during the past two years under the joint supervision of Messrs. Jakosky and Wilson. The writers are indebted to geologists and officials of various California oil companies for important collaboration in the conduct of the field work. In particular, they wish to acknowledge the valuable technical assistance and cooperation of the following: Harold W. Hoots and L. N. Waterfall, geologists, Union Oil Co. of California; H. K. Armstrong, geologist, Reserve Oil Co.; and George C. Williams, geologist, Getty, Inc. They also acknowledge the assistance of M. D. Shappell, E. M. Curry, and D. W. Fort, chiefs of field crews.

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Technical Developments

Early work in the application of resistivity methods to placer mining and water-supply problems indicated that the effective depth range of these methods could be increased if certain factors could be properly evaluated or corrected. Research work was initiated and the present electrical method developed, which allows ac-

curate and detailed mapping of structure at depths less than 4000 ft. The method has been applied extensively in California during the past two years, under what are generally conceded to be severe test conditions. Numerous opportunities, in the form of drilled wells, or known subsurface geology, were present for checking the accuracy of the work in its various applications. Hundreds of stations have been occupied and subsurface contours of certain horizons mapped. In addition, various straight-line traverses have been run, for location of fault zones. A few typical examples, illustrative of the field results, are given at the end of this paper.

Even the very simple methods, utilizing the flow and measurement of current between two electrodes and the measurement of potential between two additional electrodes with the four electrodes arranged in a known configuration, may be employed for structural investigations where the depth of penetration does not exceed 200 to 300 ft. Beyond this depth the simple methods are subject to considerable error in interpretation.

Our initial studies clearly indicated that alternating current or a periodically reversed direct current required careful determination of the strength, vector direction, phase relationship of current and potential, and contact resistance before reliable interpretation could be made of the data to determine the subsurface. Obtaining these complete relationships of the alternating-current phenomena necessitated detailed measurements and an involved instrumental technique. Furthermore, the time required for such measurements made the field work relatively slow. Alternating current having a smooth sine-shaped wave form was advantageous, but as the frequency was decreased in subsequent experiments bothersome polarization and other factors associated with the use of direct current were encountered. Commutated, periodically reversed direct current gave the greatest errors, attributable, to a large extent, to the steep wave front and irregular characteristics of the current pulses. Variations in contact resistance of the electrodes, commutator factors, inductive effects between power and potential leads, polarization phenomena (described in more detail later), and variations in current density, all contributed to the errors.

Accuracy Essential for Structural Mapping

The electrical resistance of sedimentary rocks may increase or decrease with the depth below the surface. Except where sharp lithologic changes, or changes in ground water occur, resistances of the various strata comprising the geological column usually differ only to a relatively small degree as the depth below the surface exceeds 1000 ft. This is because of the compactness of the strata and the uniform impregnation of all strata with the deeper subsurface waters.

The strata seldom have a thickness exceeding a small fraction of their depth below the surface, which, together with the relatively small differences in electrical resistance requires that the measurements made at the surface of the ground be of considerable accuracy. Specifically, the measurements must be reproducible and have an accuracy within one-fifth of 1 per cent for detail mapping of the subsurface beds. The conventional resistivity methods appear to be subject to errors of many times that amount, often being in excess of 5 per cent.

Variations in Resistivity Caused by Changes in Current Density

Generally, different values of resistance are obtained for different magnitudes of current flow.[1] Detailed measurements of various gouges and sedimentaries showed considerable changes in the apparent resistance with variations in current intensity. Subsequent field work on these and similar materials "in place" showed that sometimes the resistivity increases with an increase in current (the electrodes remaining in fixed positions) whereas at other times a material decrease in resistance occurs as the current is increased. These phenomena very likely are associated with electrolytic and ionization effects, which in turn depend upon the nature of the electrolyte contained in the strata and the chemical characteristics of the gangue or sedimentary rock materials. These variations in apparent resistivity greatly manifest themselves in the application of conventional meethods, for it is the customary procedure, in making such surface resistivity measurements, simply to employ a current flow of any convenient magnitude that will give a conveniently measurable potential for the particular spacing and electrode configuration used.

Duplicate measurements under many different conditions have shown that the irregularities due to variations in current may obscure and sometimes entirely conceal the effects due to the structural discontinuities in the earth. This same work has shown, however, that these irregularities may be practically eliminated by maintaining a regular predetermined relationship in the values of either the potential or the current at successive regularly varied electrode spacings, in order to cause either the potential or the current to be carried in a regular and systematic manner.[2]

For simplicity in field work, and interpretation of data, it is more convenient to keep the potential constant per unit volume of earth included in the measurements. Under these conditions, the current passed into the ground is of the proper value to give a predetermined potential per unit volume of material included in the measurements, and the current density per unit volume of material included in the measurements, and the current density per unit volume of material remains constant or is varied in a regular systematic manner.

Variations in Resistivity Caused by Polarization

From the viewpoint of physical chemistry, the earth may be considered as an almost nonconducting rock material impregnated with an electrolyte whose characteristics vary with different strata. An electric current flowing through such materials is subject to essentially the same laws and reaction phenomena as govern the flow of electric current through any other electrolyte or galvanic cell. Such a cell is reversible if every substance composing it is in a stable state, and under these conditions a change in the applied external electromotive force will cause reactions which will be exactly reversed by the corresponding change in the applied electromotive force. The relationship between potential and current flow through such a cell is almost linear, and the internal resistance of the cell can be determined over a fairly wide range of current flow. The resistance also remains constant regardless of the time during which the current flows. These are the conditions that prevail in a "reversible" cell.

When current is passed through the earth, however, certain chemical reactions or electrolytic effects take place whereby the system undergoes irreversible changes. Under such conditions a linear relationship does not exist between current and applied electromotive force, and the "resistance" will vary with the current density, as well as with the time during which it flows. The more complex the electrolyte, the more pronounced are the polarization and electrolytic effects. Alternating current, and direct current with commutators for rapidly changing the direction of current flow, eliminate the reversible electrolytic effects, and tend to minimize but do not eliminate the "irreversible" effects. These latter usually are cumulative and increase in magnitude with the time of current flow. Under certain conditions these effects may introduce erroneous potentials of 50 to 500 millivolts in the potential-measuring circuit. This phenomenon is especially noticeable when crossing contacts of electrochemically different materials. The abrupt changes in the depth-resistivity curves, so characteristic of present conventional "resistivity" methods, cannot possibly be due to the relatively small changes in actual

(Continued on Page 14)

Field Notes

New Potrero Area Wildcat Planned; C.C.M.O. Del Amo Well Unsatisfactory

Early development of 300 acres of the Fox Hills Country Club land lying just west of the Inglewood field and of 1000 acres west of the club lands is in early sight. George C. Atha has leased the club lands under the name of the Atha Oil Co., and plans to drill within the next 60 days. He believes that oil should be obtained between 3500 and 4000 ft., and that the area is the main Potrero anticline which has been missed while drilling has been carried on on the edges. Superior Oil Co. has leased the other 1000 acres, part of which is within the city limits, so that a municipal permit will be required to develop that portion.

Torrance-Redondo

C. C. M. O. has failed to develop anything worth while in its deep Del Amo test, other than the fact that there is an oil sand below the bottom of the older wells. Going to 4995 ft. and after having had much water trouble, the well backed up to a point between 4300 and 4400 ft., where it is now pumping an average of but slightly more than 100 bbls. per day. However, water trouble and poor mechanical condition may be responsible for this. The company is about to undertake further work on the Redondo side of the Del Amo lease.

Top of the schist has been reached by the Franz Nelson Oil Co. in the B & N well on the old golf links. Finding traces of water, a test was made and showed water at the contact with the schist. A cement plug has been put in at the bottom. A geoanalyzer test showed between 125 and 225 ft. of oil formation above the plug. No decision has been reached as to just how much to take in.

Thomas W. Simmons has obtained a decree in the Superior Court clearing his title to the old Clark well and surrounding acreage. He sued to remove the cloud created by Tom Clark's claim of an interest in the property. The Petrol Co., now holding the lease from Mr. Simmons, has its first new well underway.

George Terry and his associates, who have just abandoned their wildcat at Westminster, have acquired the 25-acre Frenger lease, formerly held by Shell, at Hawthorne and Torrance-Redondo Blvds., with two producing wells and surrounded by production. One of the wells will be deepened from its present bottom at 3566 ft. to the 4300-ft. sand in which C. C. M. O. has just completed a small well. Mr. Terry believes that with the knowledge gained by the well just completed he has a chance to get a better one.

Harry E. Sheppard, Los Angeles hotel man, has leased 80 acres near the old Julian well at Lomita and Western, and will install a steel derrick he is bringing from Venice. Foundation has been started.

Hektrol Oil Corp. will drill near the McVan well at Redondo. G. R. Van Meter, who was one of the original drillers of the Artesia test well, and L. McWherter, both of Long Beach, are the heads of the Hektrol.

The Texas Co. has completed its first well offsetting the Walken No. 1, at 3617 ft., with casing set at 3069. While no production test has been made, the well is estimated as good for about 300 bbls. per day. A perfect water shutoff has been made.

Salt Lake Tract Not Opened

The Redondo Beach City Council has declined to open the Salt Lake Tract to the drill. This action was requested by the Walken Oil Co. The Salt Lake tract adjoins the Redondo Villa tract where the present Redondo drilling is being done.

Wilmington Operations

Eyar Petroleum has been pumping 50 bbls. of clean oil per day and the company hopes this time to get it permanently on production. The fine sand at 3500 ft. has been shut off in this well. Mr. Eyar and associates will drill another well under the name of the Wilmington Oil Co. and will drill a new well close to the Eyar Petroleum office. Codri Oil Co., whose well was drilled to 3900 ft., shot off the casing and backed up to 3500, and was bailing clean oil at last reports.

Richfield Oil Co. has the derrick up for a new well on the part of the Kleinmeyer lease which lies within the Wilmington area and offsets the Eyar well. The Kleinmeyer property is part of the old Pan American holdings taken over by Richfield. It comprises large acreage on the Wilmington side of the Torrance field and much of it is proved and producing land.

Sovereign Oil Co. will get started about Aug. 1 on its Advance Truck Co. well No. 1, its second well in the Wilmington area. It is directly south of the Harbor Drilling Co.'s well. Down 3400 ft., Royalty Service is reported to be getting very good cores.

A production test over the week-end has resulted in the Fisher-Hull well, bottomed at 4012 ft., starting Sunday to pump oil into the tanks by heads at the rate of 60 bbls. per day. It still showed a little drilling water and mud but was apparently getting cleaner at last reports.

General Petroleum is still drilling ahead in its Terminal No. 1 and was in shale below 4400 ft. at last reports. Terminal No. 2 site has been graded.

Huntington Beach

Huntington Signal Oil Co., old-time operator, is starting another well near the O. C. Field gasoline plant. M. T. and W. M. Killingsworth will have charge of the work.

In the Five Points area, the B. A. L. Oil Co. is idle at 2530 ft. Five Points Oil Co. (Louis Simmel et al.) is coring below 4460 ft. Vicaroo Oil Co. has a location to drill at 22nd and Walnut in the town lot area.

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Texas Finds Pliocene In Northern Wildcat

The Texas Co. is the first to find the Pliocene formation in northern California, so far as known. The company has it in its present wildcat on the Thompkins Hills structure, Humboldt county, southeast of Eureka. Elsewhere in the north, Cretaceous has been encountered.

Texas also has wet gas at 4428 ft., the bottom of the hole, and the formation is regular, unlike much of that penetrated elsewhere in Humboldt county. Casing is being set this week at 4200 ft. to protect the hole from which a lost drill stem has just been retrieved. Its loss came when heavy gas was encountered and circulation lost. Commercial oil is hoped for around 6000 ft.

Geophysical exploration has been carried on by The Texas over several large areas in Humboldt county, and the present location was made as the result. It is quite remote from the early wells around Petrolia which were among the first in California. The Petrolia formation is generally broken.

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Edison Well Down 500 Ft.

Cole, Drais, Martter & Wood, Inc., has started a new well on sec. 24, 30-29, Edison, which directly offsets the Buffalo Oil Co.'s well which came in at 750 ft. for about 75 bbls. The new well is down about 500 ft. The organizers of the company are J. Byron Cole, Chas. W. Drais, Jr., and Perry Francis Martter, all of Los Angeles.

Field Notes

Mohawk Extends Producing Area At Mountain View In New Well

Mohawk Petroleum has apparently extended the producing belt at Mountain View more than a mile southeast and established the fact that Associated's failure to get oil immediately to the northwest of the Mohawk well was due to stopping 500 ft. too high. Associated went to 5501 ft.

Mohawk's Earl Fruit No. 1, the nw¼ nw¼ sec. 10, 31-29, has drilled to a total depth of 6015 ft. A formation tester was set with the packer at 5965 ft., leaving the 50 ft. open to the bottom. With the tester valve open 15 minutes, 42 stands of 36 gravity clean oil were recovered. The hole is now being reconditioned preparatory to setting the seven-inch casing at 5965 ft.

Cores showed the top of the Santa Margarita (Upper Miocene) to have been entered at 5735 ft. The hole is reported to be bottomed in the schist. Oil sand was also in the Kern River formation from 5397 to 5427 but it was not tested because the company wanted to go deep enough for a complete test of the lease. At 5965 the well stood suspended a short time while the company made up its mind whether to go deeper. Another 50 ft. was drilled and the test made.

Mohawk has 2400 acres in the immediate vicinity, comprising all of secs. 3, 10 and 11, the e½ sec. 4, and the sw¼ sec. 2, all in township 31-29. The well is half a mile southeast of Bankline's abandoned Symons well but a full mile from the nearest producing well, located on the Hogan Petroleum property. If the final test makes good it will open up at least five or six sections as proved or prospective land.

Grapevine-Tejon Ranch

Ohio Oil Co. was coring in basalt at 4850 ft. when reported at the week-end in its Title Insurance & Trust No. 1, sec. 36, 11n-19w, eight miles east of Wheeler Ridge and 1½ miles northeast of the Reserve Oil & Gas wells. These last have developed limited production at about 4800 ft. Ohio will drill ahead in the hope of getting oil sand below the basalt.

Hall & Baker are again coredrilling on the Tejon ranch in the same area where they worked before they suspended operations to transfer their activities temporarily to the Coast fields. They have obtained results encouraging the hope of getting commercial oil.

Buena Vista Lake Area

Four feet of oil sand were recovered in a core from 8697 to 8707 ft. in the Ohio's K.C.L. D-1, sec. 1, 30s-26e, five miles north and half a mile east of the Shell's discovery well in the 10 Section field, but on the opposite side of an intervening fault. Six feet of shale were recovered between 8707 and 8714. Ohio has been drilling for gas rather than oil.

30 Drilling at North Dome

Kenda has 19 and Standard 11 wells in various stages of drilling, coring, starting or testing at Kettleman North Dome. No other wells are active on North Dome.

Kenda's No. 21-30J, sec. 30, 21-17, was spudded in July 19. The foundation is ready for No. 58-28J, sec. 28, 21-17, and the derrick is up for No. 63-28J, same section. No. 72-34J, sec. 34, 21-17, is rigging up. No. 74-34J, same section, started flowing last Friday, bottom 7813, six-inch set at 7807. No. 74-30J, sec. 30, 21-17, bottom 8652, six-inch set at 8299, was flowing 34.2 gravity oil, 1% cut, amount not available. No. 65-20J was running oil string Sunday, bottom 8850, nine-inch casing at 8278.

Standard is rigging up its No. 46-13H, sec. 13, 21-16, and grading for No. 2-19J, sec. 19, 21-16. Other wells were in various stages of progress.

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Drilling Report

	Well No.	S.	T.	R.
New Wells				
Santa Fe Springs				
Union Oil Co.				
Alexander	33	6	3 S	11 W
Dominguez				
Union Oil Co.				
Callender	49	33	3 S	13 W
Inglewood				
Shell Oil Co.				
Rindge	21	8	2 S	14 W
Montebello				
The Texas Co.				
Baldwin	14 & 15	6	2 S	11 W
Richfield				
Union Oil Co.				
Chapman	33	30	3 S	9 W
Huntington Beach				
Vicaroo Oil Co.				
S. & G.	1-A	10	6 S	11 W
Santa Barbara County				
R. R. Bush Oil Co.				
Hancock-Bush, Brown	1	25	10 N	34 W
Midway				
Quality Oil Co.				
W. P.	3	27	32 S	23 E
C. C. M. O. Co.	18	21	32 S	23 E
Sequoia Oil Co.				
Keene	1	22	32 S	23 E
Kern County				
Associated Oil Co.	1	30	29 S	25 E
C. C. M. O. Co.	1	28	32 S	23 E
Lost Hills				
Univ. Consolidated Oil Co.				
Helm	1	20	26 S	21 E
Belridge				
Continental Oil Co.				
Result	8	36	27 S	20 E
Poso Creek				
Bethlehem Exploration Co.				
Siemon	2	10	27 S	27 E
Alphonzo E. Bell Corp.				
Fitzhugh	1	14	27 S	27 E
Kern River				
C. C. M. O. Co.	50	23	28 S	27 E
Edison				
Cole, Drais, Martter and Wood, Inc.				
Ross	1	24	30 S	29 E
Wood-Callahan Oil Co., Ltd.				
Gerard	2	23	30 S	29 E
Fruitvale				
Mohawk Petroleum Co.				
K. C. L. 23	2	23	29 S	27 E
Magnet Oil Co.				
Anderson	3	21	29 S	27 E
Western Gulf Oil Co.				
Lahore	2	21	29 S	27 E
Mt. Poso				
Ring Oil Co., Ltd.				
Knapp	1	28	26 S	28 E
Frank Goldman				
Glide	2	35	27 S	28 E
Tulare County				
Trico Oil and Gas Co.				
Callison	1	27	21 S	25 E
Mountain View				
Shell Oil Co.				
Porter Two	11	32	30 S	29 E
Kettleman North Dome				
Kenda	72	34	21 S	17 E
Kenda	63	28	21 S	17 E
Merced County				
San Joaquin Oil Co.	1	1	12 S	11 E
Madera County				
The Pure Oil Co.				
Chowchilla	5	12	10 S	13 E
DEEPEN OR REDRILL				
Santa Fe Springs				
General Pet. Corp.				
Santa Fe Comm.	186-G	6	3 S	11 W
Huntington Beach				
Associated Oil Co.				
Fowler	2	34	5 S	11 W
Rex Oil Co.				
McDonald	18	2	6 S	11 W
Brea-Olinda				
Fullerton Oil Co.	21	2	3 S	10 W
Long Beach				
Morton & Elder				
McKenzie	1	29	4 S	12 W
Midway				
C. C. M. O. Co.	1	1	32 S	22 E
Kern County				
Albert Beck	1-A	29	28 S	20 E
Belridge				
Temblor Range Oil Drlg. Co.				
Core Hole	C	24	28 S	20E
Kern River				
Standard Oil Co.	2	21	28 S	27 E
Standard Oil Co.	4 & 9	15	28 S	27 E
Italo Petroleum Corp				
Cauley	23	16	28 S	27 E
Associated Oil Co.	51	23	28 S	27 E
Mount Poso				
Petroleum Securities Co.				
Glide	3	21	27 S	28 E
Fruitvale				
White and Harr				
Scheel	1	28	29 E	27 E
Mountain View				
Shell Oil Co.				
Porter Two	3	32	30 S	29 E
ABANDON				
Long Beach				
Neva Oil Co.				
Neva	1	29	4 S	12 W
Santa Fe Springs				
Richfield Oil Co.				
Wardman	1	6	3 S	11 W
Los Angeles County				
George L. Clayton	1	31	3 S	12 W
Playa Del Rey				
G. C. Champ				
Champ	1	26	2 S	15 W
Kern County				
Santa Carla Oil Co.				
Bass & Goodknight	1	19	26 S	28 E
Poso Creek				
Bargol Oil Co., Ltd.				
Bargol	1	11	27 S	27 E
Mount Poso				
E. J. Harp and Geo. L. Tilton				
Harp-Tilton	1	6	27 S	28 E
Madera County				
The Pure Oil Co.				
Chowchilla	4	20	10 S	14 E
Kettleman North Dome				
Kenda	88	2	22 S	17 E

Editorial

Protection For Oil

CONSERVATION is constantly defended on the ground that it is indispensable to national defense. It is literally true that oil is indispensable in time of war. It is also true that we shall almost certainly fight many more wars before the pacifists' millenium arrives, if it ever does arrive. But the "brain trust," Secretary Ickes, and his bureaucrats interpret conservation as synonymous with hoarding, non-development, and oil not only left in the ground but left with no means of prompt extraction. It would be hard to imagine a greater blow to national defense than such a policy.

Conservation is good, if interpreted, as it should be, to mean development to the point of demand for the best use possible and for such storage above ground as may be needed, and to the point where we may know as nearly as possible just what supplies we have available and when we have enough wells to enable us to increase the output to the utmost limit of need when the occasion may call for it, as in time of war.

While they are thus disturbed over the theoretical danger of our oil supplies' being exhausted, leaving us without the amount necessary for national defense, we wonder why these "conservationists" give so little thought to the protection of our present developed supplies. Again and again we have pointed out the fact that our fields are all inadequately defended, when they are defended at all; that our California and Gulf Coast fields are within 100 miles of the ocean and lie open to naval attack, either direct or by airplanes launched from the decks of a hostile fleet; that it might not be impossible for hostile airplanes thus launched to play havoc even as far inland as Oklahoma; and in case of domestic insurrection, Communistic uprising or extreme labor troubles, our oil fields are defenseless.

But these facts, undeniable and unquestionably known to anyone who has given the subject any real thought, disturb the Ickes type of "conservationist" not the least. There is no sense in concealing the fact from ourselves, for our possible foreign or domestic enemies must already know it. There is an almost total failure to provide oil fields with needed protection.

Here, on the Pacific Coast, since Washington has established the policy of keeping the bulk of our fleet here, it is better than it was for many years, but protection is far short of needs. One enemy airplane carrier eluding the fleet and approaching within even 100 miles of the coast could launch an attack from the sky the consequences of which might be appalling to the oil industry and to the national defense. On the Gulf Coast the situation looks even worse.

Here is a problem that really calls for action by nation and state alike. California, every other oil producing state, and every state where there exists a huge refining industry, should see its own duty and demand that the national government take notice and co-operate in the work.

California and every oil state should have a strong state police, and should take steps to provide protection for wells, tanks, reservoirs, pipe lines, and refineries. This work should be considered, by far, the most important police duty. Complete plans should be ready for co-operation between state police, sheriffs, constables, city police, and every law enforcement agency. Sufficient state and national forces should always be stationed close to the oil fields to deal with sudden emergencies. Even though we should never have war on the Pacific, events of the last few years have demonstrated that we have enemies within, quite capable of destruction, against which we should be guarding our oil supplies night and day the year around.

People at Washington and elsewhere who are continually disturbed over the possibility of the exhaustion of our oil supplies should cease their lamentations and do something practical to safeguard what we have ready for immediate use.

Protection of our home supplies is more important and a thousand times more practical than the proposal that we acquire supplies in foreign fields. There we might be able to defend our holdings against destruction only at the cost of war, and we would require a naval force equal to the British to insure the oil's delivery here in case of a big war at sea.

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There seem to be two periods in the life of an oil man during which he exists in a state of extreme dissatisfaction—before he gets into the oil business, and after he gets into the oil business.

■ ■

Due to our nationality, however, we invariably sit near the window when we go into a cafe. Which is simply because we found out a long time ago that the people near the window get the biggest helping.

■ ■

And Oliver Field, the noted ornithologist, greatly deplores the prevalence of small eggs in the Southern California market. It is simply due to lack of experience on the part of our chicken farmers, who, he claims, are over-anxious and inclined to remove the eggs from the nests too soon.

■ ■

Harry Lee, on the other hand, one of our foremost squab raisers, promised to send us a bird for last Sunday's dinner, but apparently it got better.

■ ■

Fortunately, another fellow gave us the bird so we didn't go hungry.

EVEN THROUGH A KEYHOLE

You can see how easy it is to drill out the concrete plug and minimum amount of bakelite, which are the only two materials used inside. . . .

BAKER CEMENT EQUIPMENT

We have often wondered how anybody can get enthusiastic about raising squabs, rabbits, chickens and things. We once tried to raise a check, and the result was very discouraging.

■ ■

Now, from Portland no less, comes Phil Schnell telling us in all sincerity that service station operators in the northwest have been entirely successful in the substitution of sheep for lawn mowers. It's a natural talent with the ruminants, says Phil, and besides, you can't make fricassee of a lawn mower when you're through with it.

■ ■

He had intended to give us some statistics on the subject, but while he was counting the sheep he fell asleep.

■ ■

And, says the absent-minded executive, "Goodness, where are my glasses?" To which the smart stenographer replied, "There they are, sir, just where you emptied them last night."

■ ■

Last week an oil magazine carried the following want ad: "Wanted—four-inch iron pipe by owner of small oil refinery in good condition."

■ ■

We have been trying to figure out ever since whether it was the four-inch pipe, the owner, or the small refinery that was in good condition.

■ ■

A certain fine old oil worker, who never had the opportunity to receive an education, is mighty proud of his graduate son, and when a few folks called around at his home the other night, we musn't criticise him too severely for asking the boy to say "Fine day" in algebra for Mr. Jones.

■ ■

Nor can we blame the fond daddy who refused to let his boy study foreign relations because his relatives were all right here in the United States.

■ ■

Then there was the stenographer who worked for a big oil man and finally got him.

■ ■

"Did anybody ever tell you what a swell guy you are?" asked Byron Slater, and the gauger answered, "No, I don't believe they ever did." "Well, what gave you the idea?" was Byron's next crack.

And if the horse is rapidly becoming extinct why all this effort to make stable gasoline?

■ ■

After the Schmelling-Joe Louis fiasco the manager of a local oil company was seen in a gents' furnishing store on Broadway, selecting a hat. "But haven't you got something softer than this?" he said. "You see, I've got to eat it."

■ ■

The water is so poor in certain sections of the San Joaquin Valley that the natives boil it, filter it, chlorinate it, and then drink beer.

■ ■

Also the rotary method of drilling has been responsible for many revolutionary ideas.

■ ■

But continuous corps drilling has nothing whatever to do with the prospect of a Japanese war.

■ ■

It was Al Gore, we believe, who used to tell the story about the guy who spent ten bucks of his own good money to get a glass top for his desk. After it had been installed for about two days an equipment salesman bounced right in and sat on it. The owner never said a word, but the glass made a few cracks.

■ ■

Which brings us again to the parting of the ways or something. Remember that a pipe liner could play more soft ball, if it wasn't for his joints.

■ ■

And in the campaign to end noise, we suggest that much might be accomplished if our boarding house ladies would serve coffee in cups only—furnishing no saucers.

Production

(Figures of Production and Stocks are in Barrels of 42 Gals.)

	Total Production June	—DAILY AVERAGE— June, 1936	May, 1936	June, 1935
Group No. 1—				
Belridge—North	265,769	8,859	8,641	6,585
Belridge—South	61,916	2,064	2,139	2,659
Coalinga	492,337	16,411	16,249	19,681
Edison	178,168	5,939	5,374	2,241
Elk Hills	254,196	8,473	9,512	8,414
Fruitvale	227,272	7,576	7,453	4,912
Kern River	401,236	13,375	13,707	11,220
Kettleman Middle Dome	12,192	406	456	.....
Kettleman North Dome	2,332,938	77,765	78,103	61,690
Lost Hills	101,796	3,393	3,405	4,818
McKittrick	53,881	1,796	1,677	3,750
Midway-Sunset	1,815,936	60,531	58,192	52,731
Mountain View	838,357	27,945	28,004	21,764
Mount Poso	517,603	17,253	18,985	13,631
Round Mountain	318,538	10,618	10,567	6,045
†Ten Section (Stevens)	23,241	775	.....	.....
Wheeler Ridge	10,500	350	349	431
Group No. 2—				
Capitan	42,854	1,428	1,424	1,359
Elwood	366,856	12,228	12,886	13,726
Rincon	62,135	2,071	2,166	2,088
San Miguelito	41,737	1,391	1,455	911
Santa Barbara	46,400	1,547	1,599	3,393
Santa Maria	133,917	4,464	4,036	4,898
Summerland	1,097	37	36	38
Ventura Avenue	1,009,072	33,636	33,861	35,162
Ventura-Newhall	141,471	4,716	4,532	3,747
Watsonville	1,800	60	60	58
Group No. 3—				
Brea-Olinda	239,106	7,970	8,006	10,173
Coyote—East	68,569	2,286	2,288	2,770
Coyote—West	248,340	8,278	8,158	9,546
Domingues	779,478	25,983	25,870	21,009
El Segundo	11,817	394	324	.....
Huntington Beach	1,085,198	36,173	35,464	44,749
Inglewood	363,055	12,102	11,867	11,414
Lawndale	2,907	97	92	128
Long Beach	2,040,760	68,025	67,628	74,394
Los Angeles-Salt Lake	25,158	839	830	843
Montebello	295,115	9,837	8,088	6,117
Newport	.....	.....	.....	3
Playa Del Rey	408,392	13,613	13,683	22,235
Potrero	10,164	339	318	439
Richfield	184,813	6,160	6,186	7,537
Rosecrans	61,164	2,039	2,005	2,701
Santa Fe Springs	1,321,969	44,065	43,813	39,212
Seal Beach	276,474	9,216	9,412	9,867
Torrance	239,755	7,992	6,802	6,834
Whittier	29,814	994	941	1,039
Total	17,445,261	581,509	576,643	556,962
May	17,875,938	576,643		
Increase	430,677*	4,866		

*Decrease.

†Situated approximately twelve miles southwest of Bakersfield, in Kern County.

	June 30, 1936	May 31, 1936	June Changes	June 30, 1935
1. Non-Gasoline-Bearing Crude, Residuum, Gas and Diesel Oils	71,078,146	71,571,022	+ 407,124	63,566,659
2. Gasoline-Bearing Crude	38,142,786	38,734,077	− 591,291	33,284,045
3. Unblended Nat. Gas	2,218,751	2,133,295	+ 85,456	2,522,508
4. Gasoline (not including distirubting and service stations)	12,215,604	12,889,851	− 674,247	9,429,248
5. Naphtha Distillates	1,963,326[1]	1,689,495[1]	+ 273,831	1,290,566[1]
6. All Other Stocks	9,221,622[2]	9,500,622[2]	− 279,000	8,448,953[2]
TOTAL	135,740,235	136,518,362	− 778,127	118,541,979
[1]Estimated amount of unfinished gasoline contained in item 5	1,586,099	1,400,989		1,048,129
[2]Coke included in item 6	326,893	331,003		527,537

Development

	New Rigs Up	Producers Active Drilling	Producers Completed	Daily Initial Output	Active Producing	ABANDONED WELLS Drillers	ABANDONED WELLS Producers
Group No. 1—							
Belridge—North	1	6	1	4,038	31	....	....
Belridge—South	..	....	....	....	184	....	....
Coalinga	..	3	....	....	904	1	1
Edison	6	5	7	1,240	79	3	....
Elk Hills	..	....	....	....	157	....	....
Fruitvale	11	9	2	175	96	....	....
Kern River	5	9	7	1,138	1,251	6	....
Kettleman Middle Dome	..	....	....	....	3	....	....
Kettleman North Dome	3	26	....	....	122	....	....
Lost Hills	..	1	1	45	273	....	1
McKittrick	1	4	1	60	124	....	....
Midway-Sunset	16	14	10	3,624	2,297	....	1
Mountain View	6	8	8	5,018	154	1	1
Mount Poso	5	5	3	415	204	1	....
Round Mountain	11	8	8	2,443	92	....	....
Ten Section (Stevens)	1	1	1	820	1	....	....
Wheeler Ridge	..	....	....	....	26	....	....
Group No. 2—							
Capitan	3	3	2	456	27	1	....
Elwood	..	....	1	60	70	....	....
Rincon	..	....	....	....	32	....	....
San Miguelito	..	2	....	....	6	....	....
Santa Barbara	1	....	1	180	59	....	1
Santa Maria	3	9	....	....	189	....	....
Summerland	..	....	....	....	19	....	....
Ventura Avenue	3	6	....	....	216	....	....
Ventura-Newhall	2	17	2	345	555	....	....
Watsonville	..	....	....	....	7	....	....
Group No. 3—							
Brea-Olinda	1	....	....	....	363	....	....
Coyote—East	2	2	....	....	75	....	....
Coyote—West	..	....	....	....	40	....	....
Domingues	..	4	4	3,150	115	....	....
El Segundo	..	2	....	....	2	....	....
Huntington Beach	4	3	....	....	505	....	2
Inglewood	2	3	2	4,350	214	....	....
Lawndale	..	....	....	....	6	....	....
Long Beach	1	4	2	138	1,230	....	1
Los Angeles-Salt Lake	..	....	....	....	123	....	....
Montebello	5	9	3	3,648	187	....	....
Newport	..	1	....	....	....	....	....
Playa Del Rey	3	3	1	88	210	....	....
Potrero	..	....	....	....	11	....	....
Richfield	..	4	1	304	245	....	....
Rosecrans	..	1	....	....	75	....	....
Santa Fe Springs	1	3	5	1,285	604	....	....
Seal Beach	..	2	1	462	111	....	....
Torrance	9	9	10	2,026	465	....	1
Whittier	..	....	....	....	162	....	....
Miscellaneous Drilling	13	43	....	....	....	6	....
Group No. 4—Gas Fields—							
Buena Vista Lake	..	....	1	Gas	....	....	....
Buttonwillow	..	....	....	....	1	....	....
Chowchilla	1	1	1	Gas	....	....	....
Delano	..	....	....	....	....	....	....
Dudley Ridge	..	1	....	....	1	....	....
Goleta	..	....	....	....	....	....	....
Semi-Tropic	..	....	....	....	....	....	....
Tracy	..	....	....	....	....	....	....
June	120	231	86	35,508	11,923	19	9
May	87	250	64	39,721	11,913	36	20
Increase	33	19*	22	4,213*	10	17*	11*
Average for year 1935	86	243	64	55,082	12,136	29	17
Average for year 1934	53	196	38	47,553	11,053	21	17
Average for year 1933	30	124	21	22,842	9,190	14	18

*Decrease.

California June Production Totals

17,445,261 Bbls.; 581,509 Daily

California June production totaled 17,445,261 bbls. (A. P. I. report), daily average 581,509, increase over May, 4866 daily, and over June, 1935, 24,547. June production was distributed as follows: San Joaquin Valley, 7,905,876 bbls., of which 2,332,938 came from Kettleman North Dome, and 1,815,936 from Midway-Sunset, these two fields having more than half the Valley's June production. Compared with May, North Dome shows a nominal decline, 338 bbls. daily, Midway-Sunset a gain of 2339 daily. Los Angeles Basin comes second with a May total of 7,692,046 bbls.; Coast fields, third, with 1,847,339.

North Dome leads the entire state, Long Beach comes second, Midway-Sunset third, Santa Fe Springs fourth, Huntington Beach fifth, Ventura Avenue sixth. These six are the only fields in the state with more than 1,000,000 bbls. total for the month.

May increases and decreases of various fields, except North Dome and Midway-Sunset, were seldom more than the normal monthly fluctuations, generally less than 500 bbls. a day. The new Ten Section field produced 23,241 bbls. for the full month, with no previous production to compare it with. Its yield averaged 775 bbls. daily, but it actually produced but a fraction of the month.

Many New Wells

June witnessed the completion of 84 new California wells, two of them gas wells, but the average initial production of the 82 was only 423 bbls. per well against May's total initial daily yield of 39,721 bbls. from 64 wells, average per well, 621.

June failed to see a single new well at North Dome. The month's biggest well, by far, was one at North Belridge, good for 4038 bbls. per day. Inglewood had two, averaging 2175 bbls. Montebello had three, averaging 121 bbls. No other wells came in during the month for as much as 1000 bbls., the biggest, with the exception of those named above, being the Shell's 820-bbl. producer which opened the new Ten Section field. Midway-Sunset had 10 new wells averaging 362 bbls. Torrance-Redondo-Wilmington also reported 10 new producers, average initial yield 202 bbls.

June's new gas wells were the Pure Oil Co.'s at Chowchilla, the name officially given the new field for the first time, and the Ohio at Buena Vista Lake.

Stocks Reduced

Total stocks on hand June 30 amounted to 135,740,235 bbls., 778,127 less than on May 31, but 27,198,256 more than on June 30, 1935. The total 1936 increase of all stocks to June 30 is 5,115,589 bbls.

Stocks of non-gasoline-bearing crude, fuel, residuum, etc., were 71,978,146 bbls. June 30, 407,124 more than on May 31, and 8,411,487 more than on June 30, 1935. It appears that these stocks consisted of fuel residuum and gas-diesel oils in a much greater degree than of heavy crude. Stocks of gasoline-bearing crude, 38,142,786 bbls. on June 30, were 591,291 less than on May 31, but 4,858,741 bbls. more than on June 30, 1935.

Stocks of finished gasoline were reduced by 674,247 bbls. during June to 12,215,604 at the end of the month, but this figure is 2,786,356 more than on hand a year ago.

■ ■ ■

Water Shut Off O. K.

General Petroleum's Santa Fe 46D has received an OK on the water shut off and is reaming. Santa Fe 191E is idle at 5770 ft., after swabbing nothing much but salt water.

—ANNOUNCING—

• • •

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• • •

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Taxable Gasoline Sales Total 780,526,204 Gallons In June

With June assessments levied, taxable sales of gasoline in California for the first six months of 1936 totaled 780,526,204 gallons, with collections for June accounting for 140,151,857 gallons of the total. June assessments increased 16,332,829 gallons over assessments of 123,819,028 for May, and the June tax totalled $4,162,510.27 against $3,677,425.18. The total tax for the first six months of the year is $23,189,071.68. Approximately 10% of this tax will be refunded as having been levied upon gasoline for non-highway, Federal government, or other purposes, leaving approximately $20,000,000 net for highway maintenance and building purposes.

An all time high has been recorded in the gasoline taxes for the year ended June 30, 1936, according to the State Board of Equalization. During the past twelve months there have been taxable distributions of 1,577,359,735 gallons of motor vehicle fuel, bringing the state a revenue of $46,847,585.42. June 30 is the end of the state's fiscal year. In comparison, there were 1,344,179,194 gallons of gasoline taxed during the year ended June 30, 1935, resulting in state revenue of $39,922,123.33.

A slight realignment among the marketing companies put Standard in the lead, followed by Associated, Shell, Richfield, Union, General Petroleum, The Texas, Mohawk, Wilshire, and Rio Grande. These companies are listed in order of taxable sales.

There were 37 refiners who sold 300,000 gallons or more during June. Listed in the order of taxable sales, they follow:

	Taxable Gallonage	Total Sales
Standard Oil Co.	23,013,883	67,109,145
Associated Oil Co.	14,355,009	26,937,144
Shell Oil Co.	12,732,218	31,114,091
Richfield Oil Co.	12,048,145	12,152,135
Union Oil Co.	11,647,412	17,221,035
General Petroleum Corp.	9,498,316	40,721,534
The Texas Co.	6,502,921	21,207,171
Mohawk Petroleum Co.	6,203,616	7,107,934
Wilshire Oil Co.	5,236,532	5,195,791
Rio Grande Oil Co.	4,288,769	5,692,611
Hancock Oil Co.	4,261,304	4,448,535
The Caminol Co.	2,656,914	2,922,792
Estado Petroleum Corp.	2,275,150	2,252,856
Macmillan Petroleum Corp.	2,525,024	2,628,840
The Petrol Corp.	1,701,685	1,803,510
Exeter Refining Co.	1,659,166	1,642,815
Seaside Oil Co.	1,515,310	3,318,018
The Norwalk Co.	1,398,218	2,172,575
St. Helens Petroleum Co.	1,356,662	1,361,060
Socal Oil & Refining Co.	1,335,093	1,321,742
Ajax Oil & Refining Co.	1,315,845	1,351,331
R. R. Bush Oil Co.	1,306,286	1,293,318
Olympic Refining Co.	1,094,653	1,127,693
Triangle Oil & Refining Co.	1,083,400	1,271,976
Bell View Oil Syndicate	1,029,085	1,018,794
Envoy Petroleum Co.	1,019,113	1,008,922
Operators Oil & Refining Co.	915,995	1,105,816
El Tejon Refining Co.	627,541	621,266
Los Nietos Producing & Refining Co.	624,000	2,876,549
Fletcher Oil Co.	608,362	658,191
Bachmann Petroleum Corp.	589,599	601,909
M. M. McCallen	539,682	985,334
Edington Oil & Refining Co.	410,347	467,169
J. O. Moffett	402,780	398,772
Eagle Oil & Refining Co.	352,062	345,974
Elm Oil Co.	338,011	334,659
Lake View Oil & Refining Co.	317,709	314,532
All Others	1,366,040	.....
Total June	**140,151,857**	**274,112,539**
Total May	123,819,028	
Increase	16,332,829	
Total to June 30, 1936	**780,526,204**	

S. O. Completes 3 Wells

Standard Oil completed three wells last week, one each at Montebello, North Belridge, and Kern River. The Montebello well made 82 bbls. of oil from 3200 ft., the North Belridge well 648 bbls. from 8465, and the Kern River well 236 bbls. from 2799 ft.

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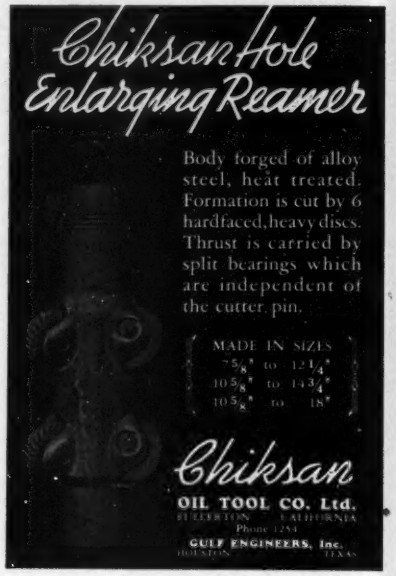
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California Production 575,000 Bbls. Per Day

California production dropped practically 10,000 bbls. per day during the week ended July 25 as compared with the previous week. Production totaled 575,000 bbls. for the week ended last Saturday, as against 584,700 for the week ended July 18, and 567,000 for the same period a year ago.

There were no exceptionally large declines in any one field, but the unlisted group as a whole dropped 5000 bbls. daily, with the Los Angeles Basin showing a decline of approximately 2000 bbls.

Comparing production of today with a year ago, the constant decline of fields in the Basin is clearly shown. The total drop for the year was 15,800 bbls., last week's figure being 217,500 bbls. against last year's figure of 233,300. In this decline, Long Beach showed the greatest change of any single field, dropping from 75,400 bbls. to 66,500 bbls. Huntington Beach and del Rey also declined, but Santa Fe Springs and Dominguez increased.

The San Joaquin Valley gained, during the same period, almost 24,000 bbls. per day in production. The largest gain here was in the unlisted group, which increased from 163,400 bbls. to 186,000 bbls. in the year. Kettleman Hills' increase also accounted for a large part of the gain, the North Dome producing 77,800 bbls. this year against 61,000 a year ago. Other changes in the Valley were nominal.

CALIFORNIA DAILY CRUDE PRODUCTION
California Oil World Estimate

	Week Ended July 25, 1936	Week Ended July 18, 1936	Week Ended July 27, 1935
Long Beach	66,500	67,200	75,400
Santa Fe Springs	44,200	45,000	40,000
Huntington Beach	36,900	37,900	44,000
Seal Beach	9,500	10,460	8,900
Inglewood.	13,000	11,500	13,000
Torrance	7,260	7,100	7,100
Dominguez	25,500	24,750	20,790
Rosecrans	1,850	2,200	2,620
Del Rey	12,350	12,650	21,000
Lawndale	90	90	130
Potrero	350	350	450
Los Angeles Basin Totals	**217,500**	**219,200**	**233,300**
Ventura Avenue	33,400	35,000	30,150
Elwood	12,600	12,350	16,500
Rincon	1,850	1,900	2,000
Kettleman Hills	77,800	77,600	61,000
Belridge	11,500	12,000	9,200
Midway-Maricopa	34,350	35,650	51,450
Rest of State	186,000	191,000	163,400
State Totals	**575,000**	**584,700**	**567,000**

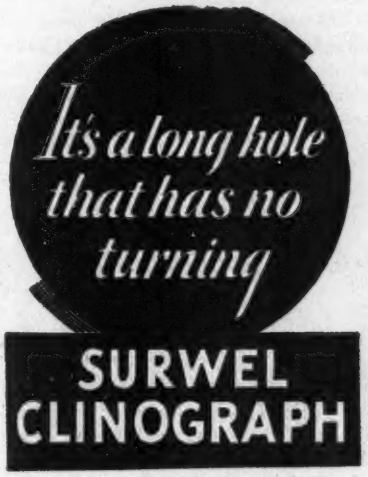
■ ■ ■

Null Starts Well

F. E. Null of Long Beach is starting a well on sec. 13, 28-27, Kern River Front.

Stevenson To Drill

Albert Stevenson of Long Beach will drill on sec. 23, 10-30, Santa Maria, about one mile north of Union's Battles No. 1, brought in flowing 1600 bbls. per day. Building the derrick will start by Aug. 1 with Mr. Stevenson superintending the work.



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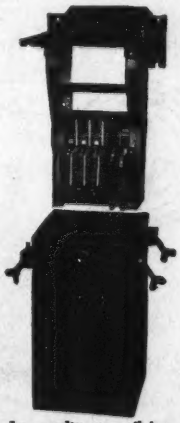

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GENERAL ELECTRIC

Whittier May Open New Area To Drill

Within the next 10 days or so, the Whittier City Planning Commission will pass upon the application of the Santa Fe Royal Oil Co. to drill prospecting wells on the E. A. Prince property on Palm Avenue within a district now zoned for residential purposes.

The company has about 170 acres under lease in the area, surrounded by Beverly Blvd. on the north and northeast, Magnolia Avenue on the east, Whittier Blvd. and Hadley Street on the south, and Norwalk Road, the city limits, on the west. The district adjoins on the north the Citrus Heights or Rideout Heights area, where small production has been developed and wells have been operating 10 years or more. The leases were originally taken by the Santa Fe Oil Co., but the development will be done by the Santa Fe Royal Oil Co.

No opposition to the granting of the permit is expected from property owners within the district. They have practically all leased their land and favored opening the district to the drill. It is not known what other opposition may develop on general principles to drilling within the city.

■ ■ ■

Lost Hills Well Fishing

Standard has one well, United No. 1, fishing at 6887 ft. in Lost Hills; three, ranging from 3090 to 3913 ft. in Midway-Sunset; two, at 3123 and 5020 ft. in Mountain View; and one at Coalinga, 2216 ft. deep, in addition to the 13 on the North Dome, on its active drilling list in the northern part of the state.

Richfield Reorganization Plan Showing Progress

The Richfield reorganization plan, which proposes a merger of the Richfield and Pan American properties with Rio Grande Oil Co., and the underwriting and purchase of securities of the new company by Consolidated Oil Corp., is finally approaching consummation.

G. Parker Toms, chairman of the Richfield reorganization committee, who has been in New York negotiating with Kuhn Loeb & Co. and the Consolidated Oil looking toward final promulgation of the plan returned here over the weekend. While no comment was forthcoming in official quarters, it was indicated that an early announcement on the plan is not improbable.

At the request of counsel of the reorganization committee Federal Judge William P. James on Saturday postponed the sale date of the Richfield and Pan American properties from July 31, to September 30, next, and at the same time put over the upset price hearing to September 26.

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Arroyo Grande Drilling Should Prove Or Disprove Large Part Of District

Drilling operations at Arroyo Grande (Oak Park) are spread out so that they should prove or disprove a large area. From where the Taft Drilling Co. is busy on the old Tiber lease, now owned by the Dolly Adams Oil Co., on the north, to the Avila Oil Co.'s new drilling well on the south, the distance is about 2½ miles. The Taft well is below 4200 ft., the Avila just getting started. The Taft well is about in the center of the s½ sec. 31, 31s-13e; the Avila near the lines of secs. 9 and 10, 32s-13e.

Between the Taft well and the Martin group of wells and those being drilled close to this property are found the old shallow producing wells, some drilled by the Tiber Oil Co. more than 30 years ago, some by the Associated later, and a few by Jergins Trust, at different times holders of the lease, now held by Dolly Adams of San Luis Obispo. However, the Taft well has gone far below these old wells.

Between the Martin group and its immediate drilling neighbors, a distance of fully 1½ miles, there are no wells and none are drilling. Lessees of intervening lands—the Havenstrite interests, Thos. Kelly & Sons, Star Petroleum and Ben Mun—are owners of the Avila and are relying upon it to prove a large part of their lands.

From the Birch-Royer's Patchett drilling well on the east to where Crail Bros. are starting to drill on the west the distance is a little more than one mile. Birch-Royer is on the sw¼sw¼ sec. 33, 31-13, the Crails near the middle of the north line of sec. 8, 32-13. Birch-Royer is again drilling and making new hole at about 1850 ft., after a long fishing and sidetracking job.

J. D. Martin recently brought in a 300-bbl. well at the south line of his property, and Jegins Trust's offset last week topped the oil sand at 2690 ft. and has been coring ahead. A second well will be drilled here to offset another Martin well on the east, now drilling below 2300 ft., after which Jergins will start drilling on its M. A. Lowther No. 1, the derrick for which has been erected but no work yet done because of the need for offsetting on the south.

North of the developed Martin properties the Blue Ridge Oil Co., headed by Bob Cook, has made location for Carpenter No. 1. With the exception of the Birch-Royer, the Blue Ridge well is the most easternly yet started.

The two old Elberta wells, the first in the Oak Park area—which put that spot on the oil map—have just been plugged by the Pismo Petroleum Corp., which now holds the lease. They were in poor mechanical condition and had ceased to pay. It is likely that another well will be started soon on the Elberta tract to offset a Martin well now drilling close to the south line.

While present drilling is thus spread over a wide area, it does not cover all that is regarded as prospective oil land, for leases have been taken to the south and east beyond the outpost drilling. Hogan Petroleum has two leases to the south and west of the Avila well, but the company has no immediate intention of drilling them.

The area now referred to officially as Arroyo Grande lies a few miles north of that town. It has been known as Tiber, Edna and Oak Park, each of these names having been applied to some part of the present field. The first wells were drilled some 30 years ago by the late Capt. John McClurg, president of the Tiber Oil Co.

■ ■ ■

Pemberton Attends Meeting

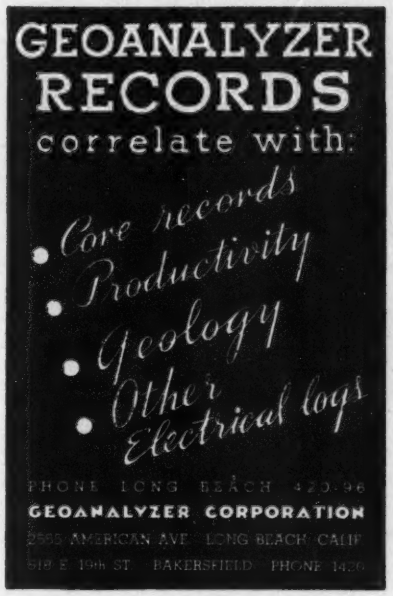
J. R. Pemberton, oil umpire, is attending the Interstate Compact Commission meeting at Dallas, July 31, as a representative of Governor Merriam. Inasmuch as California is not one of the compacting states, Mr. Pemberton is attending the meeting as an observer, and will take no official action.

Among other things to come before the delegates, the problem of simplifying and making more uniform the reports of the various states is scheduled to get attention. Further effort will also be exerted to get non-compact states to join, and to extend the compact beyond its present expiration date, which is in September, 1937.

■ ■ ■

Derrick Being Built

Harry Dearin of Bakersfield, and Joseph McDonald of Taft are building the derrick for their Carric No. 3, located 200 ft. south and west of the center of sec. 11, 28-27, Kern River Front.



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(Continued from Page 3)

resistance of the subsurface strata, and are caused largely by the previously mentioned electrolytic phenomena. It must not be assumed that excessive current densities are required to produce these effects. The potential associated with polarization is of opposite polarity to the impressed potential, and persists for a short interval of time, sometimes tens of seconds, after the flow of current has ceased. The lag or persistence of the polarization effect is the chief reason for commutation difficulty when working to depths exceeding even 500 ft.

Certain errors in obtaining the true relative resistivity values may be eliminated or minimized to negligible effects by employing much greater flows of current in the energizing circuit during short periods of time. In other words, it is advantageous for accuracy of field work and interpretation to employ heavy current flows for energizing the earth, and medium-sensitive detecting or measuring instruments for studying this flow and the distribution of current in the subsurface.

As distinguished from previous electrical work, this method utilizes the creation of an electric disturbance of high intensity but relatively short duration[3] (usually shorter than thirty seconds, and preferably less than ten seconds) which produces in the earth a short-duration electromagnetic field impulse having electrical and magnetic components. Measurements of the magnetic field or the potential values associated with the flow of current are ordinarily made at several points on the earth's surface. As the effective value of this current impulse is progressively increased with increased depth of measurement,[4] there is maintained (1) a constant potential difference, or (2) a constant current density, per unit volume of earth included in the measurement.

The principle of maintaining a high current flow for a short period of time with medium sensitive measuring apparatus may be better illustrated by comparing it to another geophysical method. In the seismic method of prospecting, a low-frequency wave is created near the surface of the ground and measurements are made at various points away from the point where the wave was first initiated. In the seismic method, a high pressure or disturbance is created for a short time by use of dynamite. If the force of the explosive were to be spread out over a considerable period of time, the disturbance set up at the surface of the ground would be negligible and would not produce any measurable effect on the present type of recording or pickup seismometers. It is conceivable, of course, that sufficiently sensitive seismometers could be built which would be capable of detecting such long-time weak seismic or flexure waves. Such improved sensitivity would not be practical, however, owing to interference from parasitic tremors caused by wind, trucks, etc., and increased ground-roll effects. In our electrical work the time interval should be relatively short so that an easily measured effect can be obtained on moderately sensitive recording equipment, with a small amount of power passed into the ground. Two or more measurements are made at each setup, with a time lapse of ten seconds or more between readings to allow polarization effects to die out. Even though a high current flow is used, the actual energy passed into the ground is less than one-tenth watt-hour when working to depths as great as 3000 to 3500 ft.

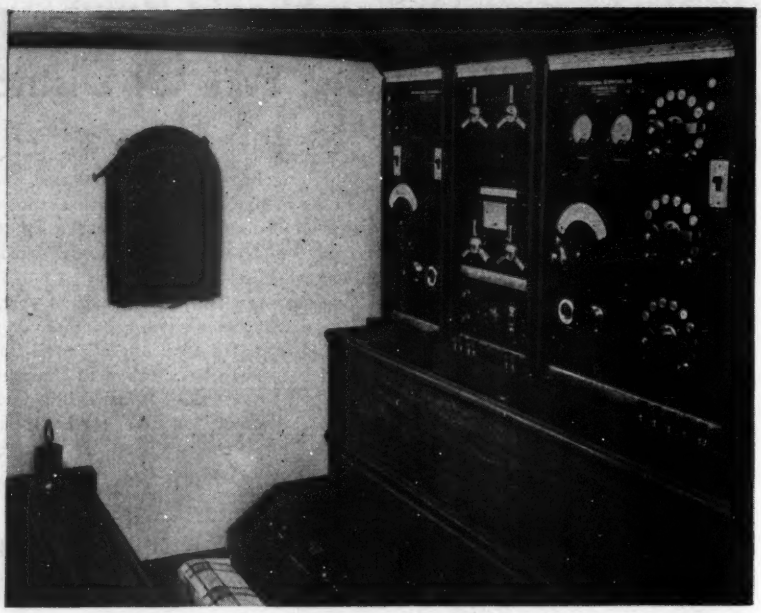

Fig. 4. Marine installation, showing apparatus used in geophysical work in offshore and submerged areas.

Field Equipment and Operating Personnel

The apparatus for conducting the work is shown in Fig 1, and consists essentially (from left to right) of (a) apparatus for ground-potential neutralization and the control keys, (b) switching and potential-measuring apparatus, and (c) power-control panel. A telephone is provided (receiver shown suspended in upper center of the view) for communication with the different line men. The apparatus is mounted across the forward end of the truck body, on a table back of the driver's seat. The three panel boxes shown weigh approximately 600 lbs. Auxiliary equipment, such as reels and field lines, storage batteries, high-voltage generator, surveying instruments, and plane table, brings the total weight to approximately 2500 lbs.

Apparatus and equipment are carried in an inclosed two-ton truck, which is leveled at a place near the desired station, and then field reels are connected to the instruments by high-voltage bushings extending through the truck body, as shown in Fig. 2. The outside ends of the lines are connected to their respective points of measurement, which have previously been surveyed and marked with numbered stakes. The instrument operator is then ready to carry out his measurements from within the truck.

The general apparatus at the end of each field line is illustrated in Fig. 3, and consists of (a) low-resistance earth electrode, (b) telephone amplifier and ground-current-minimizing instrument, and (c) real with 2000 ft. of special high-voltage insulated wire. Means are provided for connecting successive reels into the circuit as the work progresses and greater depths are involved. The numbered stake shown in the photograph between the electrode and the set box marks the point of measurement. The linemen are told by the instrument operator, via telephone, the stake number of the next point of measurement.

Field personnel varies with topography, brush, and other local conditions. Generally eleven men are used: one instrument operator, seven linemen, two surveyors, and the crew chief. The field data are calculated and plotted as the work progresses and interpretations are made shortly thereafter.

Subsea Investigations

Electrical methods of this type are well suited for structural investigations of submerged areas. A view of the complete marine installation is shown in Fig. 4. The

three panels shown in the upper part of the figure are similar in use to those in Fig. 2. In the lower portion of the figure is the continuous recorder employed for the "constant-depth" traverses. This type of traverse will be described later.

Proper location for the points of measurements or stations when working over submerged areas is usually difficult. Especially is this true in swampy areas where surveying sights cannot be taken for any large distance. An excellent method for location of stations under such conditions was developed by use of radio direction-finding equipment. Two low-powered transmitting stations are set up on shore. The location of these stations is accurately determined and plotted on a base map. By means of the direction finder on the geophysical boat, rapid location of the stations is made by taking radio direction bearings on the two shore stations and plotting the bearings on the base map. Intersection of the bearings gives the point of measurement. Proper prior calibration of the equipment must have been made to correct for distortion of the radio wave front,[4] etc. The direction-finding apparatus is shown in Fig. 5.

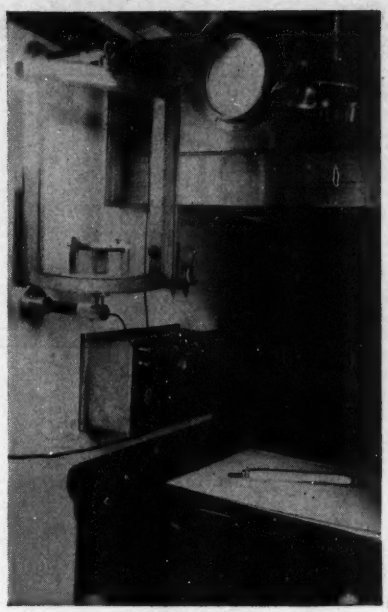

Fig. 5. Direction-finding apparatus for locations of stations in offshore geophysical work.

Interpretation of Field Data

The electrical geophysical literature on various methods of treating multi-layer problems to determine the depth of contact is fairly voluminous. Anyone that has seriously attempted to use these methods for interpretation of deep structural investigations will realize the mathematical impossibility of properly treating such problems. After considerable study from a mathematical and theoretical viewpoint by various mathematicians of our staff it was decided to base our analysis of the field data on a graphic method. In its simple form, the method consists of plotting the field data, after making proper corrections for topography, water tables, and changes in conductivity with depth, on semi-logarithmic sheets with the resistance values as abscissas (to a log scale) and the calculated depth of penetration as ordinates (to a linear scale). This results in a graphic record similar to the Schlumberger "electrical coring" or our dielectric impedance electrical logs obtained in wells. Analysis of the data from the various stations then proceeds in a manner similar to that employed in correlating electrical well logs for mapping the subsurface structure. Furthermore, the depth-resistivity curves obtained by our work may be correlated directly with the well logs; assuming, of course, that both the well log and the depth-resistivity curves are plotted to the same ordinate spacing. The measurements made at the surface of the ground will not contain the minute detail of the records made within the well but the major structural features or "breaks" will be present on the surface curves and may be correlated with the same breaks on the well curves.

Fig. 6 illustrates the general method of interpretation by use of the depth-resistivity curves. The electrical measurements were all made in a direction of S. 45° W., with the stations arranged as shown in the upper righthand portion of the figure. The curves from stations E-3 and E-4 are shown in the right-hand portion of the figure. Corresponding points of inflection are labeled with the same letter, as shown. Correlation of the various stations gave the structural profile shown in the left center portion of the figure. This work was conducted in Kern County, California, and the logs of subsequent drill holes are plotted on the profile. In this area the vertical changes in lithology are small in magnitude, and the geologic section is characterized by lens-shaped beds, with considerable variation in thickness. The sedimentary series here, being close to the source of deposition, shows considerable overlapping of the individual beds and formations, and in general is somewhat loosely consolidated and poorly sorted near the surface. Such an area provides a difficult proving ground for geophysical prospecting. The electrical method gave the necessary detail, and was able to provide an essentially accurate picture of subsurface structure. Seismic work

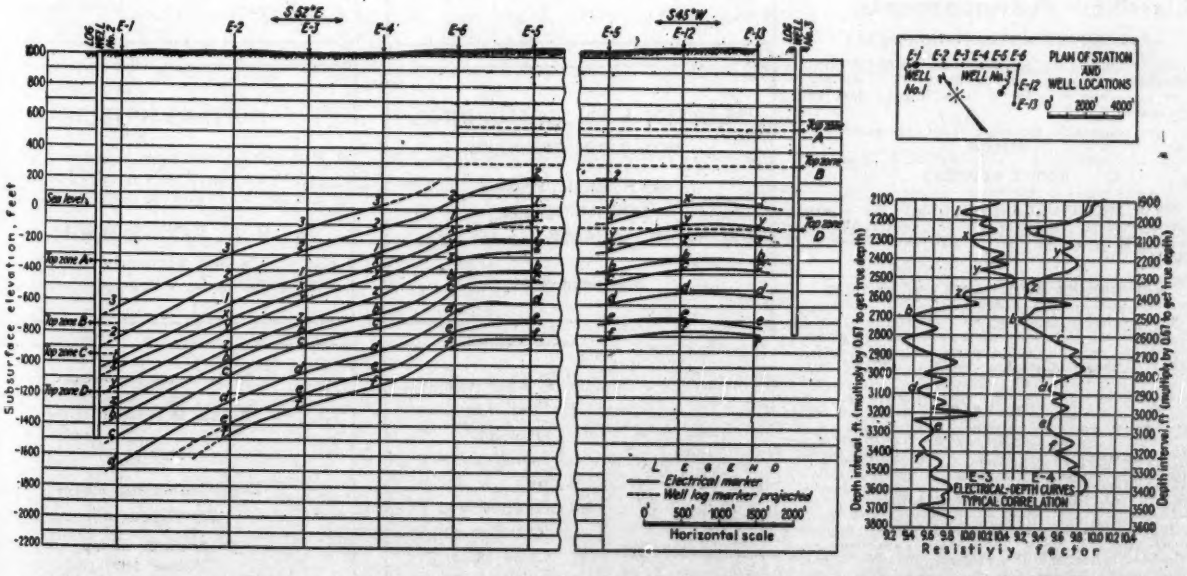

Fig. 6. Indicated structure profile through stations E-1, E-2, E-3, E-4, E-5, E-6, E-12, and E-13, Kern County, California.

was attempted in the area but it was found that no clean-cut reflecting beds are present. In addition the seismic work was hindered by the lenticular nature of the beds, with their irregular distribution of seismic velocities.

When conducting electrical work of this type the stations are arranged to allow certain "phantom beds" or electrical horizons to be contoured throughout the area. The distance between stations must be such as will allow definite recognition of corresponding inflection points. This distance varies with local conditions and is dependent largely upon the continuity of horizons throughout the area. In areas where the beds are of recent geological age and loosely consolidated, and "lenticular," or where considerable overlapping exists, the stations must be close together, oftentimes within 1000 to 1500 ft. of each other. Where clearly defined markers extend for miles through an area, such as uniform limestone and shale beds, the stations may be placed as far apart as geological experience in that particular area may dictate.

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[1]J. J. Jakosky, C. H. Wilson, and R. N. Anderson; "Electrical Properties of American Ores and Rocks," unpublished theis, University of Utah, 1928, Karl Sundberg, "Effects of Impregnating Waters on Electrical Conductivity of Soils and Rocks," TRANS. A.I.M.E., vol. 97, Geophysical Prospecting, 1932.

[2]J. J. Jakosky, patents pending covering methods or apparatus or both.

[3]J. J. Jakosky, U. S. Patent No. 2,015,401, "Method for Determining Underground Structure," issued Sept. 24, 1935, filed May 15, 1933. Other patents pending.

[4]J. J. Jakoskey, "Operating Principles of Inductive Geophysical Processes," TRANS. A. I. M. E., vol. 81, p. 168 (1929). The effects of wavefront distortions for low-powered transmitters operating in areas of rugged topography are described. See Fig. 23. Similar distortion occurs on coastwise transmissions where the radio waves travel partly over land and partly over water.

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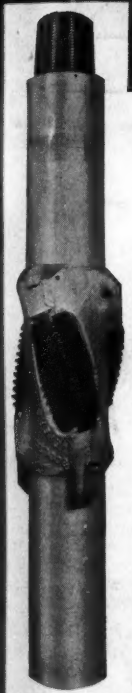

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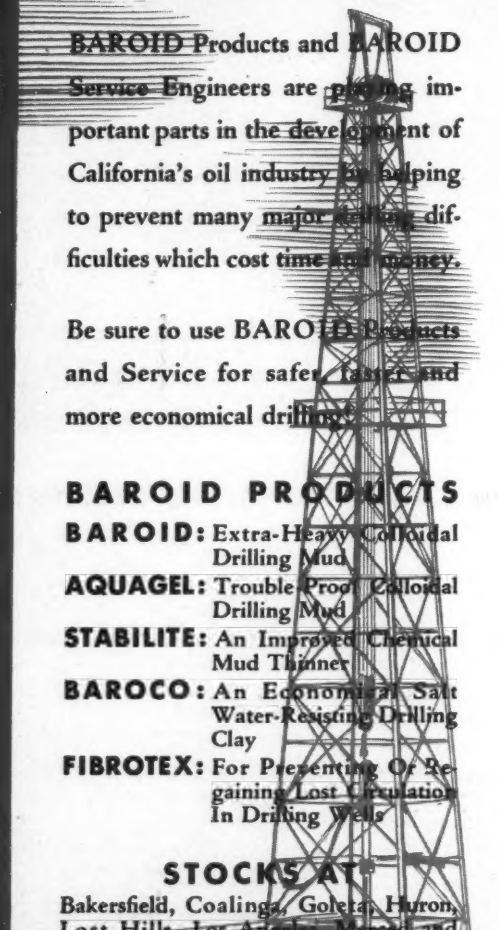

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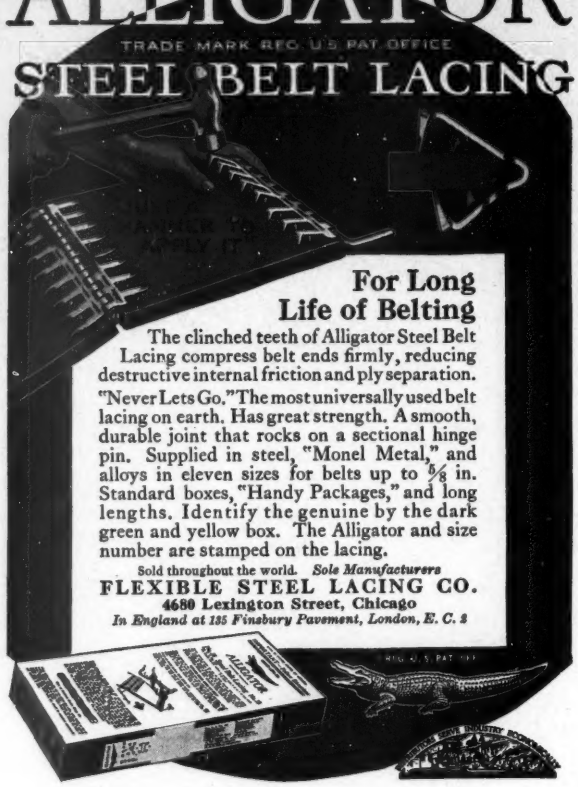

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